

AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph beginning at page 1, line 6, as follows:

The ~~present invention~~ disclosed technology relates to a solar battery module production method and a solar battery module production apparatus and, more specifically, to a production method and a production apparatus which improve productivity in production of solar battery modules.

Please amend the paragraph beginning at page 1, line 13, as follows:

~~Known as the prior art related to the present invention is a~~ A solar battery module ~~which includes a plurality of solar battery cells connected in series by bonding interconnectors to electrodes of the solar battery cells by electric welding (see, for example, Japanese Unexamined Patent Publication No. SHO62(1987)-42468).~~

Please amend the paragraphs beginning at page 2, line 18 through page 3, line 22, as follows:

DISCLOSURE OF THE INVENTION SUMMARY

In view of the foregoing, an aspect the present invention provides a solar battery module production method and a solar battery module production apparatus which ensure that solar battery cells are efficiently connected to one another with high productivity.

~~According to the present invention~~ In an embodiment, there is provided a first solar battery module production method which comprises ~~the steps of:~~

utilizing a production apparatus including a positioning belt and a heating belt located adjacent each other in a transferable manner and a press belt extending over the positioning belt and the heating belt in opposed relation to the positioning belt and the heating belt, and adapted to control the heating belt and the press belt at predetermined temperatures; positioning a plurality of solar battery cells and interconnectors required for connection of the solar battery cells on an upstream portion of the positioning belt and transporting the solar battery cells and the interconnectors to a downstream portion of the positioning belt; transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt; and holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors.

~~According to the present invention~~In another embodiment, the plurality of solar battery cells and the interconnectors required for the connection of the solar battery cells are positioned on the positioning belt. The solar battery cells and the interconnectors thus positioned are held between the positioning belt and the press belt and transferred onto the heating belt. Then, the solar battery cells and the interconnectors transferred onto the heating belt are held between the heating belt and the press belt, and soldered while being

transported. Thus, the soldering of the solar battery cells and the interconnectors can be efficiently achieved with high productivity.

Please amend the paragraph beginning at page 4, line 9, as follows:

FIG. 1 is an explanatory diagram illustrating the schematic construction of a production apparatus ~~according to an embodiment of the present invention;~~

Please amend the paragraphs beginning at page 4, lines 15-24, as follows:

FIGS. 5 are process diagrams showing a production method for a solar battery string ~~according to the embodiment of the present invention;~~

FIGS. 6 are process diagrams showing ~~the~~ a solar battery string production method ~~according to the embodiment of the present invention;~~

FIG. 7 is a process diagram showing ~~the~~ another solar battery string production method ~~according to the embodiment of the present invention;~~

FIG. 8 is a plan view of a solar battery cell ~~to be used in the embodiment;~~

Please amend the paragraph beginning at page 5, line 6, as follows:

FIG. 12 is a plan view of the solar battery string ~~produced by the solar battery string production method according to the embodiment of the present invention;~~

Please amend the paragraphs beginning at page 5, line 13 through page 6, line 12, as follows:

~~BEST MODE FOR IMPLEMENTING THE PRESENT INVENTION~~ DETAILS

A first production method for a solar battery module ~~according to the present invention comprises the steps of~~ includes: utilizing a production apparatus which includes a positioning belt and a heating belt located adjacent each other in a transferable manner and a press belt extending over the positioning belt and the heating belt in opposed relation to the positioning belt and the heating belt, and is adapted to control the heating belt and the press belt at predetermined temperatures; positioning a plurality of solar battery cells and interconnectors required for connection of the solar battery cells on an upstream portion of the positioning belt and transporting the solar battery cells and the interconnectors to a downstream portion of the positioning belt; transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt; and holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors.

~~In the present invention~~ this disclosure, the solar battery module is herein defined as a solar battery string including a plurality of solar battery cells electrically connected to one another by interconnectors, or a module

including a solar battery string sealed in a transparent resin and attached to a frame.

Please amend the paragraph beginning at page 8, line 1, as follows:

In the first solar battery module production method ~~according to the present invention~~, at least a surface of the positioning belt may be composed of a resin.

Please amend the paragraphs beginning at page 8, line 24 through page 11, line 7, as follows:

In the first solar battery module production method ~~according to the present invention~~, the positioning belt may have vacuum suction holes for transporting the solar battery cells and the interconnectors positioned on the upstream portion of the positioning belt to the downstream portion of the positioning belt in a properly positioned state.

In the first solar battery module production method ~~according to the present invention~~, the heating belt and the press belt may each be composed of a thin metal.

In the first solar battery module production method ~~according to the present invention~~, opposed portions of the heating belt and the press belt may be surrounded by a shroud, and the inside of the shroud may be kept in a nitrogen atmosphere.

According to another aspect ~~of the present invention~~, there is provided a first solar battery module production apparatus to be used for the first solar battery module production method ~~according to the present invention~~, the production apparatus comprising a positioning belt and a heating belt located adjacent each other in a transferable manner, and a press belt extending over the positioning belt and the heating belt in opposed relation to the positioning belt and the heating belt, wherein the heating belt and the press belt are each controlled at a predetermined temperature.

In the first solar battery module production apparatus ~~according to the present invention~~, at least a surface of the positioning belt may be composed of a resin.

In the first solar battery module production apparatus ~~according to the present invention~~, the positioning belt may have vacuum suction holes for transporting solar battery cells and interconnectors positioned on an upstream portion of the positioning belt to a downstream portion of the positioning belt in a properly positioned state.

In the first solar battery module production apparatus ~~according to the present invention~~, the heating belt and the press belt may each be composed of a thin metal.

In the first solar battery module production apparatus ~~according to the present invention~~, opposed portions of the heating belt and the press belt may be surrounded by a shroud, and the inside of the shroud may be kept in a nitrogen atmosphere.

According to further another aspect of the present invention, there is provided a second solar battery module production method which ~~comprises the steps of~~ includes: utilizing a production apparatus including a heating belt and a press belt disposed in opposed relation and a resilient member which biases the heating belt and the press belt toward each other, and adapted to control the heating belt and the press belt at predetermined temperatures; holding a plurality of solar battery cells and interconnectors required for connection of the solar battery cells between the heating belt and the press belt in a properly positioned state; and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors.

In the second production method ~~according to the present invention~~, the solar battery cells and the interconnectors properly positioned are held between the heating belt and the press belt, and soldered while being transported. Therefore, the interconnectors can be efficiently soldered to the solar battery cells with high productivity.

Please amend the paragraphs beginning at page 11, line 21 through page 12, line 9, as follows:

In the second solar battery module production method ~~according to the present invention~~, the resilient member may be a leaf spring.

According to still another aspect ~~of the present invention~~, there is provided a second solar battery module production apparatus to be used for the second solar battery module production method, the production apparatus

comprising a heating belt and a press belt disposed in opposed relation, and a resilient member which biases the heating belt and the press belt toward each other, wherein the heating belt and the press belt are each controlled at a predetermined temperature.

In the second solar battery module production apparatus-~~according to the present invention~~, the resilient member may be a leaf spring.

Please amend the paragraph beginning at page 12, line 17, as follows:

In an embodiment-~~of the present invention~~, solar battery cells each shown in FIGS. 8 and 9 are electrically connected to one another by interconnectors each shown in FIGS. 10 and 11 to prepare a solar battery string shown in FIGS. 12 and 13. In a process for connecting the solar battery cells by the interconnectors, a production apparatus as shown in FIG. 1 is used.

Please amend the paragraph beginning at page 13, line 1, as follows:

The solar battery cells to be used in the embodiment-~~of the present invention~~ will be described with reference to FIGS. 8 and 9. FIG. 8 is a plan view of the solar battery cell to be used in this embodiment, and FIG. 9 is a bottom view of the solar battery cell shown in FIG. 8.

Please amend the paragraph beginning at page 14, line 17, as follows:

The ~~An embodiment of a production apparatus to be used in this embodiment of the present invention~~ will be described with reference to FIGS. 1 to 4 and FIG. 14. FIG. 1 is an explanatory diagram illustrating the schematic construction of the production apparatus ~~according to the embodiment of the present invention~~, and FIG. 2 is an enlarged partial plan view of a positioning belt. FIG. 3 is an enlarged partial plan view of a heating belt, and FIG. 4 is an enlarged partial plan view of a press belt. FIG. 14 is an enlarged partial sectional view of the positioning belt.

Please amend the paragraph beginning at page 16, line 24, as follows:

Therefore, the positioning belt 110 is ~~required~~ preferred to have excellent flexibility. In this embodiment, as shown in FIG. 14, a resin belt prepared by impregnating a core material 110a of nylon filaments with a polyurethane resin 110b is used as the positioning belt 110.

Please amend the paragraph beginning at page 17, line 9, as follows:

The heating belt 120 and the press belt 130, which are required to have excellent heat conductivity, are metal belts. Therefore, the heating belt 120 and the press belt 130 are not as flexible as the resin belt. This makes it ~~impossible~~ difficult to reduce the diameters of the pulleys 121, 131 for the heating belt 120 and the press belt 130.

Please amend the paragraph beginning at page 17, line 25, as follows:

~~In this embodiment~~As an example, the heating blocks 122, 132 each can have a length of 100 cm as measured in the transport direction F, and the heating temperatures of the heating blocks 122, 132 ~~are~~can be respectively set at 265°C. and 250°C.

Please amend the paragraphs beginning at page 22, lines 3-9, as follows:

~~A~~An example production method for the solar battery string ~~according to the embodiment of the present invention~~ will be described with reference to FIGS. 5 to 7. FIGS. 5 to 7 are process diagrams showing the production method ~~for the solar battery string according to the embodiment of the present invention.~~

As shown in FIGS. 5 and 6, the solar battery string production method ~~according to the embodiment of the present invention~~ includes the steps of: positioning a plurality of solar battery cells 10 and interconnectors 20 required for connection of the solar battery cells 10 on an upstream portion of the positioning belt 110 and transporting the solar battery cells 10 and the interconnectors 20 to a downstream portion of the positioning belt 110 (FIGS. 5(a) and 5(b)); holding the solar battery cells 10 and the interconnectors 20 transported to the downstream portion of the positioning belt 110 between the positioning belt 110 and the press belt 130 and transferring the solar battery cells 10 and the interconnectors 20 onto the heating belt 120 (FIG. 6(c)); and holding the solar battery cells 10 and the interconnectors 20 transferred onto

the heating belt 120 between the heating belt 120 and the press belt 130 and soldering the solar battery cells 10 and the interconnectors 20 while transporting the solar battery cells 10 and the interconnectors 20 (FIG. 6(d)). The respective steps will hereinafter be described in detail.

Please amend the paragraph beginning at page 26, line 22, as follows:

According to one or more aspects of the present invention, the interconnectors are efficiently soldered to the solar battery cells with high productivity, so that costs for the production of the solar battery module are reduced. As a result, the solar battery module can be provided at lower costs.